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A MULTI-DIMENSIONAL SYNTHESIS OF FACTORS INFLUENCING E-LEARNING CONTINUANCE INTENTION: A SYSTEMATIC REVIEW

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ABSTRACT

Aim/Purpose	This systematic literature review seeks to synthesize and examine the key factors shaping learners' willingness to persist in e-learning courses.
Background	The proliferation of online learning, particularly Massive Open Online Courses (MOOCs) and various Learning Management Systems (LMS), has made it a central element of higher education and vocational training. However, despite advantages such as flexibility and accessibility, low continuance intention and poor course completion rates remain persistent challenges in the online learning domain.
Methodology	A systematic literature review was conducted, synthesizing findings from 21 recent studies published in the Scopus and Web of Science databases between 2019 and 2024.
Contribution	Through a comprehensive review of existing literature, this study identifies several dimensions of influencing factors, including technological aspects, individual characteristics, instructional elements, and environmental and social contexts.

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Findings	The findings indicate that learner satisfaction and perceived usefulness are key mediators between technological quality, individual traits, and continuance intention. Moreover, the use of targeted instructional strategies (such as personalized feedback and real-world case applications) and the integration of emerging technologies, including gamification and artificial intelligence, positively affect learners' engagement.
Recommendations for Practitioners	The results of this review offer practical insights for course developers and platform designers, supporting the optimization of online learning experiences to enhance long-term learner participation and academic outcomes.
Recommendations for Researchers	It provided a deep understanding of the attributes of e-learning. Learners' intrinsic motivation, personalized learning support, and timely feedback, fostering positive student-instructor and peer interactions, are key factors in e-learning.
Impact on Society	Adequate technical, resource, and policy support should be provided to encourage instructors to innovate teaching methods and create favorable learning environments for learners.
Future Research	Future research should continue to deepen the understanding of diverse influencing factors and their interactions. At the same time, the practical effects and ethical implications of emerging technologies, such as AI, VR/AR, and learning analytics in sustaining online learning engagement, should be further examined.

Keywords	e-learning, consumers' continuance usage intention, systematic literature review, satisfaction

INTRODUCTION

BACKGROUND

The rapid development of information technology has transformed the educational landscape, making e-learning an indispensable component of global education systems (Nikam & Ray, 2024; Rodrigues et al., 2019). Advances in information and communication technologies have driven the evolution from early computer-based training to today's ubiquitous MOOCs and sophisticated Learning Management Systems (LMS), enabling anywhere–anytime access, rich multimedia resources, and adaptive learning pathways (Juárez Santiago et al., 2020; Lockee, 2021). These affordances and personalized feedback have attracted millions of learners worldwide and spurred governments and institutions to invest heavily in platform development and AI-driven enhancements (World Economic Forum, 2024). The COVID-19 pandemic further accelerated the shift to remote instruction, turning e-learning from a supplementary option into the primary teaching mode, while revealing both the potential and limitations of existing systems. This shift has intensified scholarly interest in learner adaptability, satisfaction, engagement, and continuance intention under diverse conditions (Brika et al., 2022; Fauzi, 2022).

Concurrently, research has examined which technological features – such as intelligent recommendation engines, interactive forums, and mobile-optimized interfaces – most effectively foster learner satisfaction and positive attitudes, both recognized as critical mediators of sustained platform use and learning outcomes (Martinez-Garcia et al., 2023). The growing application of AI-enabled tutoring, gamification, and mobile learning highlights the need for integrated, learner-centric models that can guide practice and policy in the post-pandemic era (Hameed et al., 2024; Jia et al., 2022; Zogheib & Daniela, 2022). However, despite these advances, gaps remain in consolidating empirical evidence on the multi-dimensional factors influencing e-learning continuance intention, particularly across diverse technological, instructional, and social contexts.

PROBLEM STATEMENT

The rapid expansion of online learning presents unprecedented opportunities for promoting educational equity and lifelong learning (Molina-Arrebola et al., 2020). Yet, a persistent challenge is that, despite the abundance of resources and technological innovations, learner engagement and course completion rates remain low (Jin & Normalini, 2025; Li et al., 2021). Many MOOCs report completion rates below 10% (Li et al., 2021) and learner attrition rates between 15% and 40% across platforms (Mu et al., 2017; Tan et al., 2013), leading to wasted resources and diminished benefits. This indicates that while initial participation can be achieved, sustaining motivation and engagement remains difficult.

The COVID-19 pandemic magnified these issues, as students and instructors were compelled to transition rapidly to remote teaching without sufficient preparation, resulting in barriers such as limited technological access, reduced motivation, minimal interaction, and inadequate support services (Çakmakkaya et al., 2024; Means & Neisler, 2021; UNESCO, 2020). Even in the post-pandemic era, designing online courses that maintain learner engagement through to completion is a critical challenge. Therefore, there is a pressing need to systematically identify and understand the complex, interrelated factors shaping online learners' continuance intention and to explore effective interventions.

Addressing this gap, the present study conducts a systematic literature review of recent journal articles to examine the attributes of e-learning, analyze methodological approaches and theoretical models used in prior studies, identify limitations, and suggest future research directions. Specifically, the study aims to:

1. Identify the most important technological, individual, instructional, social, and contextual factors influencing online learners' continuance intention.
2. Examine and compare key theoretical models (e.g., TAM, ECM, IS Success Model, SDT, UTAUT) employed in studying e-learning continuance, assessing their explanatory power and limitations.

This paper is structured as follows. The methodology is detailed in the next section, the results are presented in the following section, and the last section concludes with implications for research and practice.

METHODS

ELIGIBILITY CRITERIA

Following the PRISMA-ScR guidelines (Aromataris et al., 2024; Tricco et al., 2018), this review applied a collaborative team method to establish key concepts for data extraction (Tricco et al., 2016). Only published research articles examining e-learning continuance intention were considered. Table 1 outlines the specific inclusion and exclusion criteria.

Table 1. List of inclusion and exclusion criteria for the present scoping review

	Inclusion criteria	Exclusion criteria
Exposure of interest	Continued usage of e-learning	Other e-learning: usage intention, or free MOOCs or platforms focusing on technology acceptance
Participants	Research must be e-learning-focused All ages and genders included (1) e-learning for trial, or (2) continued usage by e-learning users	Non-learning user population

	Inclusion criteria	Exclusion criteria
Reported outcomes	Learner-individual factors Technology and system factors Instructional and course factors Social and environmental factors	No outcome measures
Setting	Authentic measures	Laboratory settings
Language	English	Non-English
Type of publication	Original research, thesis	Review, conference abstracts, book chapters, technical reports
Other	All publication dates and all countries	Full text not available

Information Sources and Search

This study adopted systematic literature reviews (SLRs), lauded for their structured, transparent, and methodologically rigorous approach that guarantees objective, reliable, and reproducible results (Kraus et al., 2020). Adhering to the updated PRISMA reporting checklist (Haddaway et al., 2022), systematic search procedures were implemented to synthesize existing research on e-learning, ensuring transparency, rigor, and comprehensiveness. Scopus and WoS were selected for the searches due to their extensive coverage, transparent algorithms, and high-quality academic resources, making them ideal for systematic reviews in social science research (Kraus et al., 2020). The final search query was:

> TITLE-ABS-KEY (("e-learning*" OR "online learning*" OR "MOOC*" OR "live course*" OR "paid knowledge" OR "online education" OR "online course*" OR "open educational resource*" OR "electronic education" OR "mobile learning*" OR "education product*" OR "knowledge product*" OR "m-learning*" OR "knowledge payment*" OR "online knowledge" OR "online distance learning" OR "E-Learning courses*") AND (continue* OR continuance* OR usage* OR persistent* OR willingness to use* OR using*)) AND (LIMIT-TO (DOCTYPE, "ar")) AND (LIMIT-TO (LANGUAGE, "English"))

The keyword 'e-learning' was selected for the search string based on the research questions, following PRISMA guidelines. As e-learning is a contested term with inconsistent usage in the relevant literature, the authors reviewed numerous articles to identify synonyms, enhancing the search strings. These synonyms were combined using Boolean operators (OR) and wildcards (e.g., e-learning* or *e-learning) to retrieve a large number of relevant records and improve recall. The final search query was reviewed by experienced researchers. An information expert developed the search strategy, and the final search query was also reviewed to ensure its quality.

The literature search was carried out on May 25, 2025, and focused solely on peer-reviewed journal articles published in English between 2016 and 2025, without imposing disciplinary boundaries. To ensure rigor and reliability, only studies indexed in Web of Science (WoS) and Scopus were included, following the methodological guidance of Paul and Criado (2020). In line with Blackhall (2007), other forms of publications, such as conference papers, abstracts, theoretical contributions, and book chapters, were intentionally excluded to avoid compromising accuracy and neutrality in the findings.

The Scopus results were exported into a CSV file, while records from Clarivate WoS were manually collected. Afterward, both datasets were merged into a single file, with duplicate records eliminated using DOI numbers as unique identifiers. To maintain procedural consistency, two independent reviewers assessed the titles and abstracts of all entries. Articles that failed to meet the pre-established inclusion criteria were systematically excluded. Subsequently, the full texts of the studies that passed this initial screening were obtained for in-depth analysis.

During the full-text screening, studies focusing primarily on e-learning usage intention were removed as they fell outside the scope of this review. To enhance inter-rater reliability and reduce bias, each

author was randomly assigned a set of papers, producing a 95% agreement rate. Any disagreements were resolved through group discussions. Ultimately, all eligible studies that addressed e-learning factors accessible to learners without prerequisites were shared among the team. From these, detailed information regarding research design, study context, unit of analysis, objectives, applied theories, e-learning features, and reported limitations was extracted and coded to enable subsequent descriptive synthesis.

RESULTS

The searches in Scopus yielded 8,312 records and 7,389 records in WoS. The total number is 15,701 articles. After removing 4,912 duplicates, 10,789 papers remained. Subsequently, 10,701 articles were excluded during abstract evaluation due to insufficient thematic alignment with the study's focus on the continuance usage of e-learning. Full-text critical appraisal was conducted on the remaining 88 manuscripts, implementing rigorous eligibility criteria that excluded publications: (1) papers related to university MOOCs (n=17); (2) adoption of free MOOCs or platforms focusing on technology acceptance (n=31); and (3) consumers' retention, satisfaction, and engagement (n=19). Ultimately, 21 studies met all inclusion requirements for qualitative synthesis, constituting the final analytical sample. There are relationships between "e-learning" and other keywords shown in Figure 1 by VOSviewer. However, the relationship is overly complicated. Figure 2 extracts the key factors and clearly indicates the relationship between e-learning and other factors. The multi-stage screening protocol is visually summarized in Figure 3, adhering to PRISMA flow diagram standards for systematic review transparency (Haddaway et al., 2022).

OUTLINE OF E-LEARNING SERVICES

According to Amrutha and Geetha (2020), the systematic literature review approach frequently offers a thorough source of documentation on various definitions of the idea, use, agreements, and arguments about a topic of interest. Table 2 lists the definitions of all kinds of e-learning. The provided literature covers a diverse range of online learning services operating within the paid knowledge economy. These include broad platforms like MOOC providers (e.g., edX) which offer structured courses often in partnership with traditional institutions (Y. Shi et al., 2024), and more specialized "knowledge payment platforms" where knowledge is commercialized and service-oriented, distinct from traditional book/education formats (Huo & Li, 2022; M. Liu & Yan, 2022; J. Zhang et al., 2023). A significant subset involves social Q&A communities (e.g., Zhihu) that have incorporated paid "live courses," combining real-time broadcasting with interactive Q&A sessions (X. Shi et al., 2020; X. Zhang et al., 2024). Specific course types examined include professional development areas like Python programming (J. Zhang et al., 2022), high-value credentials such as online MBAs (Jeckells, 2021), and courses focused on personal growth and wellbeing (Serrano et al., 2024). A recurring theme is the transition or coexistence of free and paid models (Su et al., 2019; X. Zhang et al., 2024), necessitating strategies to justify the cost and demonstrate value. These services leverage various technologies to deliver content (audio, video, text, interactive elements) and cater to evolving learner needs for flexibility, skill acquisition, and personal development in a competitive digital landscape (Jeckells, 2021; Serrano et al., 2024).

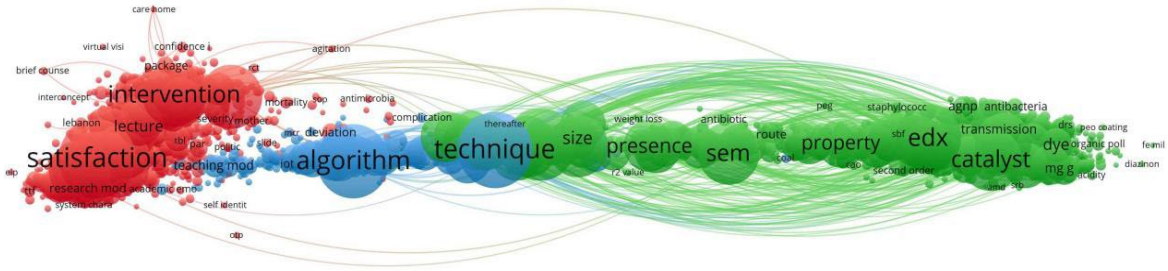

Figure 1. Network graph and raw material articles before screening

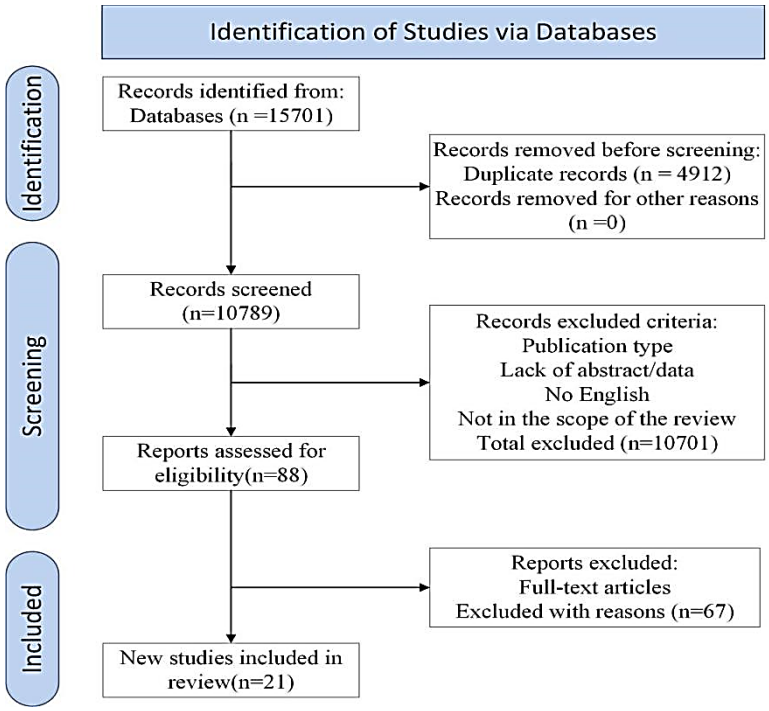

Figure 2. Stages after applying the inclusion and exclusion criteria

Table 2. Definitions of e-learning

Author(s)	Outline of e-learning services
Farmer (2019)	Online learning is the general term for learning that is provided with various digital tools.
Y. Shi et al. (2024)	Offer structured courses often in partnership with traditional institutions.
Huo and Li (2022)	Knowledge is commercialized and service-oriented, distinct from traditional book/education formats.
J. Zhang et al. (2023)	A platform where knowledge providers provide knowledge and information to people in need for a fee, which has typical characteristics of e-commerce (i.e., sales and purchases).
X. Shi et al. (2020)	Social Q&A communities (e.g., Zhihu) that have incorporated paid "live courses," combining real-time broadcasting with interactive Q&A sessions.
J. Zhang et al. (2022)	Specific course types examined include professional development areas like Python programming.
Jeckells (2021)	High-value credentials such as online MBAs.
Serrano et al. (2024)	Courses focused on personal growth and wellbeing.

Continuance intention in e-learning refers to the propensity of learners to continue using a particular online learning system, course, or platform after their initial use or participation (Bhattacherjee, 2001). This concept extends beyond the initial phase of technology acceptance or course enrollment, focusing more on the learner's long-term behavioral commitment post-experience. In the realm of online education, continuance intention is one of the key indicators for measuring the success of a learning platform or course, as it directly correlates with the depth of learning, mastery of knowledge, and the return on educational investment (Huang & Yu, 2019; Sönmez & Özdamar, 2024). High continuance intention typically signifies that learners hold a positive attitude toward their learning experience and believe that this mode of learning can meet their needs. While there remains a lack of

consensus on their precise definition, ongoing experimentation with learning frameworks and sustainable business models continues to shape e-learning's evolution.

Research Field and Publication Years of Journals

Table 3 reports the details of the articles. The 21 articles analyzed in this review were published between 2019 and 2024. The literature forming the basis of this review is primarily published in academic journals, including educational technology, medical education, nursing education, higher education research, psychology, information systems, and computer science. These journals typically focus on the application of technology in education, the evaluation of learning processes and outcomes, and user behavior. Journals represented include *Education and Information Technologies*, *BMC Medical Education*, *Frontiers of Nursing*, *Studies in Higher Education*, *Frontiers in Psychology*, and *SAGE Open*. The reviewed literature spans several interdisciplinary fields, higher education and open learning sectors, and other comprehensive or specific application-focused journals.

In terms of publication years, the vast majority of the literature referenced in this review was published between 2019 and 2024. This temporal distribution clearly reflects that e-learning continuance intention is a current hot topic in educational research. Particularly after the global outbreak of the COVID-19 pandemic in 2020, online learning became the mainstream mode of instruction, leading to a surge in related research. Studies during this period not only focused on emergency remote teaching during the pandemic but also began to delve into strategies for the sustainable development and quality improvement of online learning in the post-pandemic era. Earlier literature, such as Huang and Yu (2019), laid the groundwork for subsequent research by providing early insights into factors like learner self-management and personal initiative. Overall, the disciplinary distribution of these journals and their publication years collectively reveal the interdisciplinary nature and high contemporary relevance of research on e-learning continuance intention.

Table 3. Details of the articles

Author	Title	Journal	Theory and methodology	Sample
Aida (2023)	Impact of e-learning orientation, Moodle usage, and learning planning on learning outcomes in on-demand lectures	Education Sciences	Multiple factors on learning outcomes, no explicit model Quantitative questionnaire	82
Bai et al. (2022)	Effect of perceived fear, quality, and self-determination on learners' retention intention on MOOCs	Psychology Research and Behavior Management	Comprised of IS success, expectation confirmation, and self-determination theories Quantitative questionnaire	284
Butt et al. (2022)	The role of institutional factors and cognitive absorption on students' satisfaction and performance in online learning during COVID-19	PLOS ONE	Integrated the TAM, TTF, IS Success, and UTAUT Quantitative questionnaire	404
Çakmakkaya et al. (2024)	Factors affecting medical students' satisfaction with online learning: A regression analysis of a survey	BMC Medical Education	Factors affect satisfaction, no explicit model Quantitative questionnaire	1600

Author	Title	Journal	Theory and methodology	Sample
Chang et al. (2023)	Mediating effect of e-learning quality on learning outcomes through student satisfaction in nursing education	Frontiers of Nursing	Adaption model based on D&M IS success model Quantitative questionnaire	241
Faozi and Handayani (2023)	The antecedents of mobile-assisted language learning applications continuance intention	Electronic Journal of E-Learning	ECM and self-determination theory Quantitative questionnaire	445
Gegenfurtner et al. (2020)	Evaluating webinar-based training: A mixed methods study of trainee reactions toward digital web conferencing	International Journal of Training and Development	No explicit model Mixed methods Quantitative and qualitative	419 & 23
Goode et al. (2023)	Implications of immersive scheduling for student achievement and feedback	Studies in Higher Education	Block and immersive delivery models; the Southern Cross model Quantitative questionnaire	9655 & 3267
Huang and Yu (2019)	Exploring the impact of self-management of learning and personal learning initiative on mobile language learning: A moderated mediation model	Australasian Journal of Educational Technology	No explicit model, framework by author Quantitative questionnaire	323
Jia et al. (2022)	Research landscape of artificial intelligence and e-learning: A bibliometric research	Frontiers in Psychology	Knowledge mapping	137
Juárez Santiago et al. (2020)	Learning management system-based evaluation to determine academic efficiency performance	Sustainability	Learning Management System (LMS) factor models Quantitative questionnaire	25 students per course
S. Liu and Huang (2023)	Examining teachers influence on MOOCs learners continuance learning intention: The mediating effects of perceived usefulness and satisfaction	Journal of Pedagogical Research	ECM, TPB Quantitative questionnaire	166
Means and Neisler (2021)	Teaching and learning in the time of COVID: The student perspective	Online Learning	No explicit model Quantitative questionnaire	1008
Molina-Arrebola et al. (2020)	Digital resources for transfusion education	Journal of Education and Health Promotion	No explicit model Observational study	680
Mtebe (2020)	Examining eLearning system self-efficacy amongst instructors at the University of Dodoma, Tanzania	Open Praxis	Bandura's theory and relevant factors Quantitative questionnaire	357

Author	Title	Journal	Theory and methodology	Sample
Rohan et al. (2021)	How gamification leads to continued usage of MOOCs? A theoretical perspective	IEEE Access	Expectation confirmation model Quantitative questionnaire	206
Shalabi and Almurdi (2024)	Satisfaction and attitudes towards online continuous medical education and its impact on clinical practice among physiotherapists	BMC Medical Education	No explicit model Quantitative questionnaire	127
Sönmez and Özdamar (2024)	Examining the factors related to learners' intention and usage continuity of online learning	Open Praxis	Sustained TAM Quantitative questionnaire	1314
Wang et al. (2023)	Development and empirical study of international student satisfaction model of online course learning interaction in Chinese universities	Education and Information Technologies	International student satisfaction index model and TAM Quantitative questionnaire	320
Xue et al. (2023)	Examining the affordances of an online learning platform: A usefulness theoretical perspective	Sage Open	Theoretical framework (from Kirschner et al., 2004) Quantitative & qualitative	32
Zogheib and Daniela (2022)	Students' perception of cell phones effect on their academic performance: A Latvian and a Middle Eastern university cases	Technology, Knowledge and Learning	TAM Quantitative questionnaire	103

Paper Types and Methods Used

The literature referenced in this review demonstrates diversity in paper types and research methodologies, though empirical studies predominate. The most common paper type involves quantitative research methods. Scholars widely use questionnaire surveys to collect large-scale learner data and employ statistical analysis techniques (such as regression analysis and structural equation modeling) to validate hypotheses and models. For instance, Çakmakkaya et al. (2024) used regression analysis to investigate factors affecting medical students' online learning satisfaction. Studies utilized Structural Equation Modeling (SEM), particularly Partial Least Squares SEM (PLS-SEM) or Covariance-Based SEM (CB-SEM), to test complex theoretical models, analyze path relationships among multiple latent variables, and explore the mediating effects of variables like perceived usefulness and satisfaction. Factor analysis (exploratory or confirmatory) is also commonly used for scale development and validation, ensuring the reliability and validity of measurement instruments (Sönmez & Özdamar, 2024). Many quantitative studies are inherently cross-sectional, collecting data at a specific point in time to analyze relationships between variables (Shalabi & Almurdi, 2024).

In addition to purely quantitative research, some literature employs qualitative research methods or mixed-methods research designs to gain a deeper and more contextualized understanding. For example, Gegenfurtner et al. (2020), in evaluating the effectiveness of webinar-based training, combined questionnaire surveys with narrative interviews, using qualitative content analysis to process interview data, thereby achieving a more comprehensive understanding of trainee reactions. Xue et al. (2023),

in their study of online learning platform affordances, also utilized online observations, online surveys, and semi-structured interviews, coding qualitative data through content analysis. Mixed-methods research can combine the generalizability of quantitative research with the depth of qualitative research, offering more comprehensive explanations for complex educational phenomena (Gegenfurtner et al., 2020).

Another noteworthy paper type is bibliometric research. The study by Jia et al. (2022) is an example of this, where they employed bibliometric methods and visualization tools (like VOSviewer) to analyze the research landscape and trends in the field of artificial intelligence and e-learning, revealing key authors, institutions, countries, journals, and knowledge structures in the domain. Such studies help researchers gain a macroscopic understanding of the developmental trajectory and frontier hotspots of a specific field.

Regarding specific analytical techniques, beyond the aforementioned SEM and regression analysis, studies frequently use descriptive statistics (such as means, standard deviations, and frequencies) to present sample characteristics and basic variable distributions. T-tests and Analysis of Variance (ANOVA) are used to compare differences in relevant variables among different learner groups. Some studies, like Aida (2023), when analyzing the relationship between learning behaviors and learning outcomes, may incorporate data mining techniques like cluster analysis. Other research specifically focuses on the predictive power of their models, as explored by Sönmez and Özdamar (2024). Bai et al. (2022) utilized Importance-Performance Map Analysis (IPMA) to prioritize key influencing factors.

In summary, the research field concerning factors influencing e-learning continuance intention presents a diversified research landscape, predominantly quantitative and empirical, supplemented by qualitative and mixed methods. Structural Equation Modeling is the primary tool for testing theoretical models and complex relationships, while bibliometrics offers a macroscopic perspective for understanding field development.

Theories and Comparison

One of the objectives of this review is to identify the methodologies and the various theoretical frameworks employed in the provided studies investigating the continuance usage of e-learning courses. The systematic review literature draws upon a diverse set of theoretical frameworks to explain consumer behavior in the context of continuance usage of e-learning courses. Their theoretical foundations are listed in Table 4.

The most frequently cited models are from information systems areas. The Technology Acceptance Model (TAM) is one of the most frequently cited theories. Proposed by Davis (1989), TAM's core variables are Perceived Usefulness (PU) and Perceived Ease of Use (PEOU), which are considered key determinants of a user's attitude toward using technology, subsequently influencing their behavioral intention and actual usage (Butt et al., 2022; Juárez Santiago et al., 2020; Zogheib & Daniela, 2022). Many studies extend TAM by incorporating external variables such as perceived enjoyment (Zogheib & Daniela, 2022), social influence, and facilitating conditions to enhance its explanatory power in specific educational contexts (Rohan et al., 2021).

The DeLone & McLean IS Success Model offers a comprehensive framework for evaluating the effectiveness of information systems, with core dimensions including system quality, information quality, service quality, intention to use/use behavior, user satisfaction, and net benefits (Bai et al., 2022; Butt et al., 2022; Chang et al., 2023). In e-learning research, this model is used to assess how various quality dimensions of a learning platform or course influence learner satisfaction and perceived value, ultimately impacting their learning outcomes and continuance intention.

The Task-Technology Fit (TTF) theory emphasizes the degree of match between the functional characteristics of a technology and the requirements of the learning task, positing that users will perceive usefulness and continue usage only when the technology effectively supports task completion (Butt

et al., 2022). Usefulness, as described by Xue et al. (2023), evaluates the usefulness of educational systems from two dimensions: usability and utility, where the utility can further relate to educational and social affordances.

The Unified Theory of Acceptance and Use of Technology (UTAUT/UTAUT2) integrates and extends earlier models like TAM. It proposes performance expectancy, effort expectancy, social influence, and facilitating conditions as direct determinants of user intention to use technology, and considers moderating variables such as gender, age, experience, and voluntariness of use (Butt et al., 2022; Juárez Santiago et al., 2020). UTAUT2 further incorporates factors like hedonic motivation, price value, and habit.

Beyond the models and theories from information systems areas, there are theories that talk about psychology and intrinsic motivation. The Expectation-Confirmation Model (ECM), developed by Bhattacherjee (2001), is particularly suited for explaining post-adoption continuance behavior. ECM emphasizes that users' expectations, perceived performance, the degree of expectation confirmation, and satisfaction are critical factors influencing their continuance intention (Bai et al., 2022; Faozi & Handayani, 2023; S. Liu & Huang, 2023; Rohan et al., 2021). When learners perceive their online learning experience (performance) to meet or exceed their initial expectations, it leads to higher confirmation and satisfaction, thereby enhancing their willingness to continue learning.

Self-determination theory (SDT) focuses on the intrinsic and extrinsic sources of human motivation, emphasizing that satisfying an individual's basic psychological needs for autonomy, competence, and relatedness is crucial for fostering intrinsic motivation and sustained behavior (Bai et al., 2022; Faozi & Handayani, 2023; Rohan et al., 2021). In online learning environments, supporting learner choice, enhancing their sense of learning efficacy, and fostering a good community interaction atmosphere can stimulate intrinsic learning motivation, thereby increasing continuance intention. Social Cognitive Theory (SCT), particularly its concept of self-efficacy, is also commonly used to explain online learning behavior (Mtebe, 2020). A learner's belief in their ability to successfully complete online learning tasks directly affects their effort, persistence, and ultimately, their continuance decisions.

These theories, while having distinct focuses, are interrelated. TAM and UTAUT are more oriented towards the cognitive and early intention stages of technology acceptance, whereas the IS Success Model is more concerned with post-adoption satisfaction and continuance. SDT and SCT provide complementary perspectives from the angle of learners' intrinsic motivation and psychological needs. Many studies tend to integrate constructs from these theories to build more comprehensive explanatory models. For example, Rohan et al. (2021) and Bai et al. (2022) integrated ECM and SDT in their research. The study by Butt et al. (2022) even combined TAM, TTF, DMISM, and UTAUT. This integration reflects researchers' efforts to comprehensively understand e-learning continuance intention from multiple dimensions (technological, individual, social, and instructional). The earlier TAM model is relatively concise, while subsequent UTAUT and various extended models attempt to include more contextual and individual difference factors. ECM and the IS Success Model are particularly important in continuance research due to their emphasis on "satisfaction" as a core mediating variable. The introduction of SDT allows research to delve deeper into learners' intrinsic psychological drivers.

Table 4. Theoretical frameworks distribution

Theoretical foundations	Number of articles
Information systems perspectives	
Technology Acceptance Model (TAM)	5
DeLone & McLean IS Success Model	3
Task-Technology Fit	1
Unified Theory of Acceptance and Use of Technology (UTAUT / UTAUT2)	2

Theoretical foundations	Number of articles
Psychology and intrinsic perspectives	
Expectation-Confirmation Model (ECM)	4
Self-Determination Theory (SDT)	3
Social Cognitive Theory (SCT)	1
Other diverse theories and models	
Usefulness Theory	1

Our Research Objectives and Main Relevant Factors

The core research objective of this systematic literature review is to comprehensively identify and deeply understand the key factors influencing learners' continuance intention in e-learning courses, through a systematic integration and analysis of existing high-quality research literature (Table 5). We aim to transcend the limitations of single studies by constructing a more macroscopic and systematic map of these factors, revealing their internal connections, mechanisms of action, and manifestations within different theoretical frameworks. The main findings and relevant factors are listed in Table 5. Specifically, this review is dedicated to summarizing and elucidating the main relevant factors in the following areas.

This systematic literature review, based on the 21 articles provided, reveals that the decision to continue using e-learning courses is a complex phenomenon driven by a wide array of interconnected factors. The first aspect is learner-individual characteristics and psychological factors. These are the intrinsic drivers influencing continuance intentions. We focus on learners' motivation (Bai et al., 2022; Faozi & Handayani, 2023; S. Liu & Huang, 2023; Rohan et al., 2021), self-efficacy (Mtebe, 2020), learning expectations (Wang et al., 2023), learning planning and self-management abilities (Aida, 2023; Huang & Yu, 2019), cognitive absorption (Butt et al., 2022), personal learning initiative (Huang & Yu, 2019), prior experience and familiarity with online learning (Çakmakkaya et al., 2024), and, in specific contexts perceived fear (Bai et al., 2022). These factors directly influence the depth and persistence of learner engagement.

The second area is related to technology and system-related factors. The characteristics of the online learning platform are fundamental to the learning experience. This review focuses on e-learning's system quality, information quality, and service quality (Bai et al., 2022; Chang et al., 2023), users' perceived usefulness (PU) and perceived ease of use (PEOU) of the platform (S. Liu & Huang, 2023; Rohan et al., 2021; Zogheib & Daniela, 2022), the platform's technical performance (such as stability, response speed) and potential technical problems (Çakmakkaya et al., 2024; Wang et al., 2023), LMS affordances (Xue et al., 2023), and specific platform (e.g., Moodle) usage behaviors (Aida, 2023). These factors collectively constitute the direct experience of learners interacting with the technology.

Third, instructional and course design factors play roles in e-learning continuance usage. The design of the teaching process and course content is crucial for maintaining learner engagement. We examine course quality (Bai et al., 2022), instructional design (Aida, 2023; Gegenfurtner et al., 2020), teacher influence and faculty skills (Çakmakkaya et al., 2024; S. Liu & Huang, 2023), course interactivity (Çakmakkaya et al., 2024; Wang et al., 2023), and the effectiveness of feedback mechanisms (Goode et al., 2023; Means & Neisler, 2021). High-quality instructional interventions can significantly enhance learning outcomes and satisfaction.

Beyond the core determinants, social, environmental, contextual, and innovative factors play roles in e-learning's continued usage. Learning is not an isolated activity; the social environment significantly impacts it. This review focuses on social norms or social influence (S. Liu & Huang, 2023; Sönmez & Özdamar, 2024), social presence in online learning (Xue et al., 2023), institutional factors and support (Butt et al., 2022; Mtebe, 2020), and peer interaction (Gegenfurtner et al., 2020). Specific contexts and innovative teaching methods also affect continued learning. For example, the COVID-19 pandemic as a special context profoundly impacted online learning models and learner behaviors (Butt et

al., 2022; Means & Neisler, 2021). The application of emerging technologies like gamification (Rohan et al., 2021) and Artificial Intelligence (AI) (Jia et al., 2022), as well as innovations in teaching models like immersive scheduling/block model learning (Goode et al., 2023), may all positively influence learners' continued engagement.

Table 5. E-learning reviewed key factors

No	Factors	Key sub-dimensions	Authors
1	Learner-individual characteristics and psychological factors	Motivation, self-efficacy, learning expectations, learning planning, self-management abilities, cognitive absorption, personal learning initiative, prior experience and familiarity, perceived fear, attention span	Rohan et al. (2021), Bai et al. (2022), Faozi and Handayani (2023), S. Liu and Huang (2023), Mtebe (2020), Wang et al. (2023), Aida (2023), Huang and Yu (2019), Butt et al. (2022), Çakmakkaya et al. (2024)
2	Technology and system-related factors	System quality, information quality, service quality, perceived usefulness, perceived ease of use, technical performance, technical problems, affordances, usage behaviors	Chang et al. (2023), Bai et al. (2022), Zogheib and Daniela (2022), S. Liu and Huang (2023), Rohan et al. (2021), Wang et al. (2023), Çakmakkaya et al. (2024), Xue et al. (2023), Aida (2023)
3	Instructional and course design factors	Course quality, instructional design, teacher influence, faculty skills, interactivity, feedback mechanisms	Bai et al. (2022), Gegenfurtner et al. (2020), Aida (2023), S. Liu and Huang (2023), Çakmakkaya et al. (2024), Wang et al. (2023), Goode et al. (2023), Means and Neisler (2021)
4	Social and environmental factors	Social norms or social influence, social presence, institutional factors and support, peer interaction	Sönmez and Özdamar (2024), S. Liu and Huang (2023), Xue et al. (2023), Butt et al. (2022), Mtebe (2020), Gegenfurtner et al. (2020)
5	Contextual and innovative factors	COVID-19 pandemic, Artificial Intelligence (AI), gamification, immersive scheduling/block model learning	Means and Neisler (2021), Butt et al. (2022), Rohan et al. (2021), Jia et al. (2022), Goode et al. (2023)
6	Mediating and moderator variables	Learner satisfaction, perceived usefulness, expectation confirmation, perceived value, learning outcomes/performance	Çakmakkaya et al. (2024), Chang et al. (2023), S. Liu and Huang (2023), Rohan et al. (2021), Bai et al. (2022), Wang et al. (2023), Goode et al. (2023), Zogheib and Daniela (2022), Huang and Yu (2019)

Between the aforementioned factors and the ultimate continuance intention, the factors mediate and moderate these relationships. Learner satisfaction and perceived usefulness are widely considered key mediating variables (Çakmakkaya et al., 2024; Chang et al., 2023; S. Liu & Huang, 2023; Rohan et al., 2021). Additionally, expectation confirmation and perceived value also play important roles (Bai et al., 2022; Wang et al., 2023). The final learning outcomes/performance are both a result of continued learning and may, in turn, influence future continuance intention (Goode et al., 2023; Huang & Yu, 2019; Zogheib & Daniela, 2022). Through a systematic review of these main relevant factors, this study aims to provide a comprehensive theoretical perspective and practical reference for enhancing online learners' continuance intention.

The expanded conceptual model (Figure 3) synthesizes the findings of this systematic literature review, integrating five primary categories of influencing factors: technological, individual, instructional, social, and contextual. Meanwhile, perceived usefulness and learner satisfaction act as key mediators, transmitting the effects of these factors to continuance intention. This model not only consolidates prior theoretical perspectives but also offers a comprehensive framework for guiding future research and practical interventions in e-learning environments.

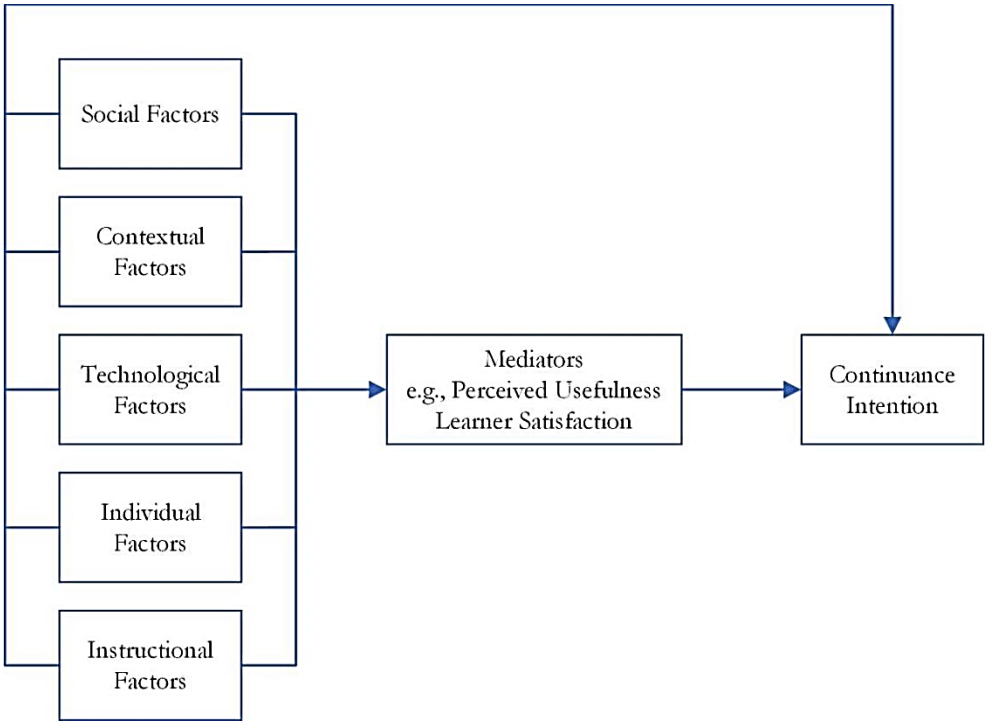

Figure 3. Expanded conceptual model of factors influencing e-learning continuance intention

CONCLUSION

This paper contributes to the e-learning literature by systematically synthesizing recent empirical studies and integrating multiple theoretical models to develop a comprehensive framework for understanding the factors influencing learners' continuance intention. The continued usage of e-learning is a complex and dynamic field of research. By reviewing this specific set of literature, this paper has highlighted its key characteristics, impacts, and challenges. The study revealed that the existing literature provided a sound basis for understanding e-learning consumers' continuance usage behaviors. Based on the 21 articles between 2019 and 2024, this systematic literature review reveals that the decision to continue using online courses is a complex phenomenon driven by a wide array of interconnected factors. These factors can be broadly categorized into learner-individual factors, technology and system factors, instructional and course factors, and social and environmental factors. At the learner-individual level, motivation (especially intrinsic and integrated motivation), self-efficacy, learning planning skills, and prior experience and expectations with online learning play crucial roles. At the technology and system level, the platform's system quality, information quality, service quality, as well as perceived ease of use and technical performance, are fundamental, directly impacting the learner's user experience. At the instructional and course level, high-quality course content, effective teaching interactions, clear instructional design, timely feedback, and positive teacher influence are

vital for maintaining learner engagement. At the social and environmental level, institutional support, social norms, and interactions within the learning community are also non-negligible.

Second, among the numerous influencing factors, learners' perceived usefulness and satisfaction have been repeatedly validated as core mediating variables. Regardless of how external factors (such as system quality or teacher influence) operate, they typically need to enhance learners' perceived usefulness (i.e., the learner believes online learning can help achieve learning goals or improve performance) and satisfaction (i.e., the learner's positive affective response to the online learning experience) to ultimately translate into continuance intention. Theories such as the Expectation-Confirmation Model (ECM) and the IS Success Model provide strong theoretical support for understanding this mediation mechanism.

Thirdly, various theoretical models have been applied to explain e-learning continuance intention, with the TAM and its extensions, ECM, the IS Success Model, and SDT being the most widely used frameworks. Research trends indicate that a single theory often struggles to comprehensively capture all relevant factors. Therefore, integrating different theoretical perspectives (such as combining cognitive factors with motivational factors, and individual factors with social factors) to construct comprehensive models has become an important direction for enhancing explanatory and predictive validity.

Furthermore, the exploration of emerging technologies and instructional models presents new opportunities for enhancing learner continued engagement. For example, gamification design has been shown to effectively boost learning motivation, and the application of artificial intelligence in personalized learning support and intelligent tutoring also demonstrates significant potential. By optimizing learning pace and reducing cognitive load, innovative course organization methods, such as immersive scheduling or block models, may also positively impact learning completion rates.

Practical Implications and Future Outlook

The findings of this review offer significant guidance for practitioners in online education. First, platform developers and course designers should prioritize enhancing system usability, content practicality, and service responsiveness to ensure learners can easily start and gain valuable learning experiences. Second, educators should focus on stimulating and sustaining learners' intrinsic motivation, providing personalized learning support and timely feedback, and fostering positive student-instructor and peer interactions. Third, at an institutional level, adequate technical, resource, and policy support should be provided to encourage instructors to innovate teaching methods and create favorable learning environments for learners, as highlighted by Martinez-Garcia et al. (2023) in their examination of system quality and learner satisfaction.

This review provides both theoretical insights by integrating diverse models into a unified framework and practical guidance for course designers and policymakers to enhance learner retention in e-learning environments. Future research should continue to deepen the understanding of various influencing factors and their interactions. For example, more comparative studies targeting learners from different disciplinary backgrounds, cultural regions, and age groups can be conducted to explore the universality and specificity of these factors. Longitudinal research designs would be beneficial for tracking the dynamic changes in learners' continuance intention and the evolution of influencing factors over time. Concurrently, the actual effects and ethical considerations of emerging technologies such as AI, VR/AR, and learning analytics in promoting continued online learning engagement should be further evaluated. Finally, how to effectively translate theoretical research findings into actionable teaching strategies and platform design guidelines, bridging the gap between research and practice, will be a crucial issue for ongoing attention in future research.

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